

EXHIBIT 8

EXPERT REPORT

Sean Smith and Crystal Smith

v.

CSAA Fire and Casualty Insurance Company

Case No. 5:17-cv-1302-D,

United States District Court for the Western District of Oklahoma

Prepared by:

J. Stephen Ford, Ph.D., P.E.

ZFI Engineering Co. Project #18039-01

August 23, 2018

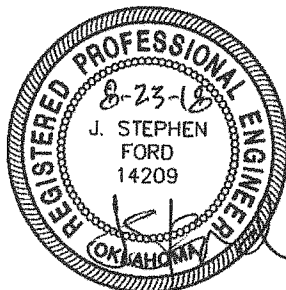
Prepared for:

R. Greg Andrews

Robinson Renaissance Building

119 North Robinson, 11th Floor

Oklahoma City, OK 73102



Structural **Solutions** that Work
ZFI Engineering Co.
8411 S. Walker Ave.
Oklahoma City, OK 73139
Ph: 405-634-3393
Cert. of Auth. #CA-994
Exp. 6/30/19

Expert Opinion Report of
J. STEPHEN FORD, PH.D., P.E.

August 23, 2018

GENERAL

ZFI Engineering Co. was retained by Greg Andrews, Esq. on 2 April 2018 to determine if existing damage to a residence located at 314 East 8th Street, Cushing, OK was caused by an earthquake on 7 November 2016. J. Stephen Ford, Ph.D., P.E., a Senior Investigative Engineer with ZFI, conducted an on-site assessment of the residence on 20 April 2018.

For the purpose of this report, the front of the house is considered to face south. The house is a single-story wood-framed house that was purported to have been constructed in 1920. There is a non-enclosed carport on the west side of the house.

Subsequent additions to the house were constructed on the north and east sides of the house. The floor structure for the original house is wood framed over a non-vented crawl space. The east addition appears to have involved enlarging and enclosing a slab-on-ground patio slab that was located at the northeast corner of the original house.

The living room is located in the southeast corner of the house. The dining area and kitchen are located to the north of the living room. There are two bedrooms on the west side of the living room and the south side of the kitchen. The northernmost of the two bedrooms is accessed from the kitchen. Access to the crawl space under the wood-framed portion of the house is located in the southeast corner of this bedroom. Attic access for the original portion of the house is located on the north side of the dining room. The attic access for the north addition is located near the southeast corner of the addition.

The interior and exterior of the house were inspected. Access constraints prevented an examination of the southernmost bedroom on the west side of the living room. The attic over the original portion of the house was inspected by standing on a ladder with my torso above the ceiling framing at the attic access hatch in the dining room. Access constraints and an extremely muddy subgrade in the crawlspace prevented accessing the crawlspace. Portions of the floor framing and the associated support system were examined by lying on the floor and hanging the upper portion of my torso below the bottom of the floor framing.

Opinions and Basis of Opinions

Opinion #1 – It is my opinion that the November 2016 earthquake did not cause structural damage to the house. (Opinion #2 includes additional opinions and discussion regarding the vertical support for the wood floor system in the original house.)

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Basis for Opinion #1 – Based on my observations, there are a number of structurally significant issues that exist in the house. However, these are not due to seismic activity but are due to:

1. poor drainage around and under the house,
2. a lack of an appropriate foundation around the perimeter of the northeast addition,
3. long-term water penetration into wood members that has resulted in rotted wood in the carport structure, the windowsills, and in the sill plate for the walls of the northeast addition, and
4. a lack of a dowelled connection between the original patio slab and a new strip of slab that was used to increase the size of the northeast addition beyond the size of the original patio.

A visual inspection of the roof geometry from the exterior of the house and limited observations in the attic did not identify any damages to the roof framing that were consistent with those from seismically induced loads. In addition, the carport is not laterally braced on three sides. Due to its low lateral stiffness relative to the rest of the house, a large-scale lateral instability or other significant damage would typically have occurred in the carport if the main portion of the house was damaged by seismically induced loads. No lateral instability or non-water related damages were observed in the carport structure.

Opinion #2 – The floor elevation measurements in the Rimkus report (ref. 1) indicate a downward movement in the middle of the living room and the middle of the kitchen from 1.3” to 1.5”, relative to the dining room elevation. At isolated locations under the original portion of the house, the horizontal wood structure is supported on stacks of non-mortared bricks at some locations and wood posts at other locations. The bricks were observed to have become dislodged at one location near the west wall of the northwest bedroom, immediately north of the crawlspace access hole (i.e., near the kitchen), and at a location a few feet southeast of the crawlspace access location (i.e., near the west living room wall). Access constraints prevented an observation of the vertical supports under a major portion of the living room.

What caused the bricks to become dislodged cannot be determined with absolute certainty. Based on the lack of other seismically-related damage in the house and carport, it is my opinion that the instability of the bricks was most likely caused by soil movements due to the highly saturated subgrade that exists in the crawlspace.

Basis for Opinion #2 – According to the Weather Underground website, there had not been measurable rainfall for 13 days prior to the on-site assessment on 20 April 2018. However, the soil in the crawlspace was so muddy that the crawlspace could not be accessed. The amount of moisture in the crawlspace is most likely due to the lack of ventilation and the extremely poor drainage conditions around the perimeter of the house (i.e., a lack of gutters and downspouts and a lack of adequate slope away from the house for the surrounding grade).



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Seismic induced forces on a structure are a function of the mass (i.e., weight) of the structure. Consequently, for a small, single-story, wood-framed house without any masonry, the seismic forces are very small from a structural engineering perspective and consequently, there is a low probability that the house structure and/or foundations would be damaged by the 2016 earthquake. Conversely, there is a reasonably high probability that the extremely wet soil conditions which were observed would result in movements that would cause the brick supports to become unstable.

The Rimkus floor elevation survey indicates that the floor is down 1.1" at the northeast corner of the living room and 1.3" at the southeast corner of the living room, relative to the dining area. These downward movements are not consistent with the type or location of damage that would be expected to occur as a result of seismically induced forces. The locations strongly suggest that a portion of the wood framing along the east side of the living room has failed due to water-related rotting of the wood floor joists. This is another indication of the significant amount of water that has existed in the crawlspace and is supportive of the opinion that the dislodged brick supports are due to moisture issues in the soil rather than seismic forces.

Opinion #3 – The repair of the dislodged brick supports can be accomplished by accessing the locations where those elements are located, jacking up the floor structure to the appropriate elevation, and then reconstructing the masonry supports. There may have been a small amount of cosmetic damage to the north and west walls of the living room when the floor structure deflected. This cosmetic damage can be repaired using standard renovation construction techniques after the floor structure is raised.

Basis for Opinion #3 – The required repair techniques are very common and typically used to address the conditions that exist in this house.



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Facts or Data Considered

The following information was reviewed and evaluated in the process of developing the above opinions:

1. Rimkus Report of Findings, Structural Evaluation, Claim No: 1002259499, prepared for CSAA Insurance Company, by Lisa M Holliday, P.E., Ph.D., PE OK 24558.

Exhibits

Other than the materials, facts, photos and data relied upon as described above, the exhibits that will be used at trial to support the above opinions have not been determined at this time. The *Opinions and Basis of Opinions* section of this report references a document that might be used as an exhibit. Other reviewed documents may also be used to supplement those documents.

Qualifications

A CV containing my educational background, states in which I'm licensed, publications, and employment history is included as an Appendix to this report. In addition to the information contained in my CV, other applicable experience includes:

- Each year, I personally perform, or lead teams, that investigate or perform assessments of more than 75 projects that involve structural strength, serviceability or construction failures.
- In the last six years, I have performed approximately 150 assessments of single-family or multi-family residential structures.
- Many of the structures that I have evaluated during my professional career have involved an assessment of potential seismic damage, moisture-related volumetric changes in soils, and construction deviations.

Previous Testimony

My previous testimony by either trial or deposition during the last four years is shown in the Appendix to this report

Compensation

My services on this project are invoiced on a time and reimbursable expense basis. The hourly rate for my services is \$250/hr.



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Appendix A



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Curriculum Vitae
J. STEPHEN FORD, Ph.D., P.E.

EDUCATION:

University of Texas at Austin	Ph.D.	1977
University of Texas at Austin	M.S. Civil Engineering	1974
Oklahoma State University	B.S. Architectural Engineering	1970

PROFESSIONAL ENGINEERING LICENSES:

Texas, 1980, #48061	Ohio, 1990, #E-54101	Nebraska, 1995, #E-8339
Okla., 1985, #14209	Nevada, 1995, #011255	Mich., 1989, #035025
Kansas, 1985, #10339	Iowa, 1990, #11768	Colorado, 1999, #33538
Miss., 1986, #9774	Georgia, 1992, #019920	Wyoming, 2000, #8966
Florida, 1989, #41552	Hawaii, 1991, #7419	Wisc., 1990, #26757

PROFESSIONAL SOCIETIES:

Former Member, American Concrete Institute
Former Member, Prestressed Concrete Institute
Past National Director representing OK, American Council of Engineering Companies
Past Chairman, American Council of Engineering Companies of Oklahoma
Former Member, Joint ACI-ASCE Committee 441, Reinforced Concrete Columns
Former Member, Inactivated Joint ACI-ASCE Committee 428, Inelastic Behavior of Reinforced Concrete Structures
Former Member, Inactivated Prestressed Concrete Column Committee
Past President (twice), Structural Engineering Council of Oklahoma
Past President, OK Chapter American Concrete Institute

PUBLICATIONS:

(with J.C. Bocox, G.B. Hasselwander, and J.M. Hargis) "The Inside Story – Oklahoma City Civic Center Music Hall", *Civil Engineering*, v.72, No.7, July 2002.

"Construction Inspection - Can you Afford Not to Do It?", Proceedings of a Symposium sponsored by the Construction Division, ASCE National Convention, San Francisco, California, October 4, 1984.

(with D.C. Chang and J.E. Breen) "Behavior of Unbraced Multipanel Concrete Frames", *ACI Journal*, Proceedings, V.78, No.2, March-April 1981.



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PUBLICATIONS: (cont'd)

(with D.C. Chang and J.E. Breen) "Experimental and Analytical Modeling of Unbraced Multipanel Concrete Frames", ACI Journal, Proceedings, V.78, No.1, January-February 1981.

(with D.C. Chang and J.E. Breen) "Behavior of Concrete Columns Under Controlled Lateral Deformation", ACI Journal, Proceedings, V.78, No.1, January-February 1981.

(with D.C. Chang and J.E. Breen) "Design Indications from Tests of Unbraced Multipanel Concrete Frames", Concrete International: Design and Construction, V.3, No.3, March 1981.

"Behavior of Concrete Columns in Unbraced Multipanel Frames", Civil Engineering Structures Research Laboratory, The University of Texas at Austin, December, 1977.

"Effects of Beam Loads on an Unbraced Multibay Concrete Frame with Unequal Column Stiffnesses", Civil Engineering Structures Research Laboratory, The University of Texas at Austin, January, 1974.

(with J.E. Breen and D.C. Chang) "Limit Design Aspects of Frame Behavior - Series B Frames", Civil Engineering Structures Research Laboratory, The University of Texas at Austin, June, 1973.

(with R.L. Pinc) "Space Frame Program Using the Stiffness Method", School of Architecture at Oklahoma State University, May, 1971.

(with L.O. Bass and R.L. Pinc) "Design-Analysis Graphs for USD Tied Columns with Biaxial Bending", School of Architecture at Oklahoma State University, October, 1970.

AWARDS and COMMUNITY SERVICE:

American Concrete Institute Wason Medal for "Most Meritorious Papers" - awarded for the four papers with Chang and Breen listed above.

Member of The University of Texas Civil, Architectural and Environmental Engineering Academy of Distinguished Alumni.

Member of Board of Directors, Neighborhood Services Organization, Oklahoma City, OK.



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Member of Board of Directors, Epworth Villa Continuing Care Retirement Community,
Oklahoma City, OK.

RESEARCH CONTRACTS: (Principal or Co-Principal Investigator)
(with C.E. Locke and J.G. Laguros) "Feasibility Evaluation of the Impregnation of Concrete
Polymers for Bridge Deck Applications", Oklahoma Department of Transportation.

"High Quality Bridge Decks Cast Under Adverse Atmospheric Conditions", Oklahoma
Department of Transportation.

EMPLOYMENT:

Date: January 2018 to Present
Employer: ZFI Engineering Co. (formerly ZAHL-FORD, Inc.)
Position: Senior Investigative Engineer
Job Description: Internal consulting with other engineers in the firm, on-site assessments and
performing investigative engineering services. These services many times
involve forensic engineering and expert witness consulting and/or testimony.

Date: March 1980 to December 2017
Employer: ZFI Engineering Co. (formerly ZAHL-FORD, Inc.)
Position: Executive Vice President
Job Description: Supervising engineering operations for 19 person firm, project management
and internal consulting with other engineers in the firm, contract
administration, client relations, on-site assessments and performing
investigative engineering services. These services many times involve
forensic engineering and expert witness consulting and/or testimony.

Date: August 1978 - March 1980
Employer: ELLISOR AND TANNER, INC., DALLAS, TEXAS
Position: Structural Design Engineer/Project Engineer
Job Description: Work included the analysis design, drawing production management, and
construction services for several large projects (a 3400 car precast concrete
garage, an 800 car precast concrete garage, a 250,000 sq. ft. precast concrete
office building). The work also included, for a period of several months,
managing the construction services for an \$80 million dollar complex which
consisted of two 25-story office buildings, a 9-story parking garage, and a
16-story hotel.



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Date: January 1976 - July 1978
Employer: SCHOOL OF CIVIL ENGINEERING & ENVIRONMENTAL SCIENCE, UNIVERSITY OF
OKLAHOMA, NORMAN, OKLAHOMA
Position: Assistant Professor
Job Description: Taught undergraduate and graduate classes in concrete design, indeterminate
structures, statics, engineering materials and strength of materials.

Date: August 1972 - October 1975
Employer: U.S. ARMY RESERVES (part time)
Position: 1st Lt./Construction Officer in a Battalion S-3 Office
Job Description: In charge of project planning and design for an organization of
approximately 1000 people.

Date: May 1973 - December 1975
Employer: CIVIL ENGINEERING DEPARTMENT
UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TEXAS
Position: Graduate Teaching Assistant
Job Description: Instructor for undergraduate steel and concrete design classes.

Date: August 1971 - December 1975
Employer: CIVIL ENGINEERING STRUCTURES RESEARCH LAB
UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TEXAS
Position: Research Assistant
Job Description: Masters and Ph.D. work included physical testing, data reduction, and
analysis of 1/4-scale concrete frames.

Date: January 1971 - May 1971
Employer: SCHOOL OF ARCHITECTURE, OKLAHOMA STATE UNIVERSITY,
STILLWATER, OKLAHOMA
Position: Instructor
Job Description: Teaching architectural structural analysis and design classes.

Date: March 1968 - May 1971
Employer: L.O. BASS, CONSULTING ENGINEER, STILLWATER, OKLAHOMA
Position: Jr. Design Engineer
Job Description: Major structural analysis and steel design. The work included performing a
portion of the analysis and design of three long-span stadium roofs



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(Louisiana SuperDome, Texas Stadium, and an 800' geodesic dome for Erie County, Buffalo, New York - not built).

Date: Summers 1966 through 1969 and 1971
Employer: J.M. DAMBOLD AND ASSOCIATES, CONSULTING ENGINEERS,
LAWTON, OKLAHOMA
Position: Draftsman and Jr. Design Engineer
Job Description: Structural detailing, steel and concrete design, structural analysis, and office management.



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Testimony
J. Stephen Ford, Ph.D., P.E.
August 22, 2014 – August 22, 2018

1. Mike Hembree, and Reesa Hembree vs. Cornerstone Homes by Chris Moock, L.L.C., an Oklahoma Limited Liability Company, and Chris Moock, individually;
Case #: CJ-2013-5607
District Court of Oklahoma County, State of Oklahoma
Testimony Date: 9-18-2015 (arbitration)
ZFI Project #14025-01
2. Guy Leach and Ashleigh Leach vs. GS Legacy Corner, LLC; Inland American Midwest City Legacy Corner, LLC; Inland American Apartment Management, LLC, d/b/a Legacy Corner Apartments
Case #: CJ-2013-5011
District Court of Oklahoma County, State of Oklahoma
Testimony Date: 10-14-2015 (deposition)
ZFI Project #14120-01
3. Philip Bird and Charla Bird (Plaintiffs) vs. Michael W. Barnett, D/B/A Barnett Building Co., and R.J. Byrd Construction, Inc. (Defendants); and Michael W. Barnett D/B/A Barnett Building Co. (Third-Party Plaintiff) vs. Higgins & Sons Roof Truss Co., Inc., Fox Building Supply, LLC, Clyde Millus D/B/A Millus Masonry, Consolidated Builders Supply, Inc., Basement Contractors, Inc., Accord Construction, Inc., and J&L Construction & Remodeling, LLC, Spurlock Masonry, Inc., Jason D. McCurdy Masonry, Willie Byrd, Willie Byrd Construction, Inc., Triple S Systems, Inc. Absolute Tile & Floors, LLC, and Young Brothers, Inc. (Third-Party Defendants)
Case #: CJ-10-1605
District Court of Cleveland County, State of Oklahoma
Testimony Date: 1-24-17 (deposition)
ZFI Project # 11188-01
4. John and Laura Foegelle (Plaintiffs) vs. Kelly and Mary Ann O'Dell (Defendants); consolidated with John and Laura Foegelle (Plaintiffs) vs. Select Management Group, LLC, D/B/A Coldwell Banker Select: Julie Tetsworth; McGraw Realtors; and Brian Guthrie (Defendants)
Case #: CJ-2014-408 and CJ-2015-248



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District Court of Wagoner County, State of Oklahoma
Testimony Date: 4-07-17 (deposition)
ZFI Project # 16018-01

5. Asset Group, Inc. (Plaintiff) vs. Corrugated Erectors, Inc., River City Drywall, LLC, and Travelers Casualty and Surety Co. (Defendants); Corrugated Erectors, Inc. (Third-Party Plaintiff) vs. Gravity-Ratterman, LLC., FCCI Insurance Co., Philadelphia Indemnity Insurance Co., and Great American Insurance Group (Third-Party Defendants)
Case #: 5:14-cv-00435 F
United States District Court for the Western District of Oklahoma
Testimony Date: 10-17-17 (deposition)
ZFI Project # 15089-01&02
6. Angela Hardridge (Plaintiff) vs. Hibdon Tire Center, Inc., Morgan Tire and Auto, Inc., RFB Properties, Inc., and RFB Properties, LLC. (Defendants)
Case #: CJ-2016-6300
District Court of Oklahoma County, State of Oklahoma
Testimony Date: 9-9-17 (deposition)
ZFI Project # 17073-01
7. American Home Assurance Company a/s/o TopGolf (Claimant) vs. ACE Golf Netting, LP (Respondent)
Case #: 01-16-0004-7470
American Arbitration Association
Testimony Date: 11-14-17 (deposition)
ZFI Project # 17166-01&02
8. Timberlake Construction Co., Inc. (Plaintiff) vs. NN Properties, LLC D/B/A Real Time Products; TMC Construction Company, Inc.; Dodson-Thompson-Mansfield, PLLC (Defendants)
Case #: CJ-2015-1312
District Court of Oklahoma County, State of Oklahoma
Testimony Date: 3-29-18 (deposition)
ZFI Project # 15151-01



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9. James Blocker and Jami Blocker, husband and wife, et al. (Plaintiffs)
vs. ConocoPhillips Company (Defendant)
Case No. CIV-17-248-D (Removed from OK Cnty Case No. CJ-2016-3981
United States District Court for the Western District of Oklahoma
Testimony Date: 07-12-18 (deposition)
ZFI Project # 17085-01

-END-

